

Oct-BE-Insem.-16
B.E. (Mechanical) (Semester - I)
DYNAMICS OF MACHINERY
(2012 Pattern)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.
- 2) Net diagram must be drawn if necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of non programmable calculator is allowed.
- 5) Assume suitable data if necessary.

Q1) Four masses A,B, C and D are completely balanced. Masses C and D makes an angle 90 and 150 respectively with B in the same sense. The rotating masses have mass and radial spacing are $m_b = 25 \text{ kg}$, $m_c = 40 \text{ Kg}$, $m_d = 35 \text{ Kg}$, $r_a = 150 \text{ mm}$, $r_b = 200 \text{ mm}$, $r_c = 100 \text{ mm}$ $r_d = 180 \text{ mm}$ Planes B and C are 250 mm apart determine. **[10]**

- i) The Mass A and its angular position
- ii) The positions of Planes A and D.

OR

Q2) A three cylinder radial engine at 1500 rpm is having its axis at 120 at each other. The stroke is 120 mm and each connecting rod is 215 mm long. The mass of reciprocating engine is 3 Kg per cylinder. Determine the primary and secondary unbalanced force acting on engine. **[10]**

Q3) a) Find the frequency oscillation for the roller if it rolls without slipping for the system as shown in fig (1) **[6]**

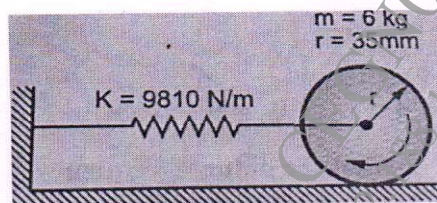


Fig.(1)

P.T.O.

- b) In a single- degree of freedom viscously damped vibrating system, the suspended mass of 16 Kg makes 45 oscillations in 27 seconds. The amplitude of natural vibration decreases to one fourth of the initial value after 5 oscillations. Find, [4]
- i) Logarithmic decrement.
 - ii) The damping factor.

OR

- Q4)** a) Define logarithmic decrement and derive an expression for it in terms of damping ratio. [6]
- b) With neat sketches explain under damped, over-damped and critically damped systems. [4]
- Q5)** a) Explain forced vibration with rotating unbalance. [6]
- b) Explain transmissibility versus frequency ratio curve for different amount of damping. [4]

OR

- Q6)** a) System having rotating unbalance has total mass of 25 kg. The unbalanced mass of 1 Kg rotates with a radius 0.04m. It has been observed that at a speed of 1000 rpm system and eccentric mass have a phase difference of 90 degree and the corresponding amplitude is 0.015m. Find [6]
- i) Natural frequency of the system
 - ii) Damping factor.
 - iii) Amplitude at 1500 rpm.
 - iv) Phase angle at 1500 rpm.
- b) A spring mass and damper system is subjected to harmonic force. The amplitude is found to be 0.02 m at resonance and 0.01 m at frequency 0.75 times the resonant frequency. Find damping ratio of the system. [4]

